
Birds of the Boé region, south-east Guinea-Bissau, including the first country records of Chestnut-backed Sparrow Lark *Eremopterix leucotis*, Lesser Striped Swallow *Cecropis abyssinica* and Heuglin's Wheatear *Oenanthe heuglini*

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Aves da região do Boé, sudeste da Guiné-Bissau, incluindo registos de três novas espécies para o país. Durante os meses de janeiro e fevereiro de 2013 foi levado a cabo um levantamento da avifauna no sector do Boé, sudeste da Guiné-Bissau. Este trabalho permitiu identificar um total de 170 espécies de aves, das quais, três constituem novos registos para o país: cotovia-pardal-de-dorso-castanho *Eremopterix leucotis*, andorinha-estriada-pequena *Cecropis abyssinica* e chasco de Heuglin *Oenanthe heuglini*. Vinte e três das espécies registadas encontram-se restritas ao bioma de savana Sudano-Guineense, doze são restritas ao bioma de floresta Guineo-Congolense e cinco são espécies prioritárias para a conservação. Este constitui o primeiro levantamento da avifauna desta região da Guiné-Bissau. São também apresentados registos efectuados na região por P. Wit durante 2007–13. O sector do Boé é dominado por diversos habitats de savana e alberga uma elevada diversidade de fauna e flora. Um projecto para a criação de dois parques nacionais e três corredores para a fauna está a ser implementado na região. No entanto, os actuais usos dos solos e recursos naturais constituem potenciais importantes ameaças à preservação da biodiversidade e dos serviços dos ecossistemas do sector do Boé.

Summary. During an ornithological survey of the Boé region, south-east Guinea-Bissau, in January and February 2013, 170 bird species were recorded. Of these, three were new for the country: Chestnut-backed Sparrow Lark *Eremopterix leucotis*, Lesser Striped Swallow *Cecropis abyssinica* and Heuglin's Wheatear *Oenanthe heuglini*. Twenty-three species are restricted to the Sudan-Guinea Savanna biome, 12 to the Guinean-Congo Forest biome and five are of global conservation concern. This was the first avifaunal survey in the area. Additional bird observations made by P. Wit in 2007–13 are also presented. The Boé region is dominated by a variety of savanna habitats and harbours very interesting biodiversity. A project to establish two national parks and three wildlife corridors is being implemented. However, current uses of land and natural resources constitute potentially important threats to the biodiversity and ecosystem services, and require urgent attention.

The avifauna of Guinea-Bissau is amongst the least known on the African continent. Its ornithological importance is mostly related to the country's coastal-marine biome, a vast area that harbours *c.* 1 million Palearctic waders during the boreal winter (Robertson 2001), of which the Bijagós Archipelago is probably the most important (Dodman & Sá 2005). However, Guinea-Bissau terrestrial ecosystems are also regionally and globally important for their avian diversity and conservation value, and include 35 bird species restricted to the Sudan-Guinea Savanna biome and 58 to the Guinea-Congo Forest biome (Dodman *et al.* 2004). Guinea-Bissau currently lacks inland reserves. This is of concern as ongoing human population growth is increasing pressure on natural habitats, primarily for agricultural use and associated intensification

(Cincotta *et al.* 2000), factors recognised as major threats to biodiversity worldwide (Pereira *et al.* 2012). Cashew tree plantations, which constitute the main economy of the country (World Bank 2009), have increased considerably in recent years at the expense of natural forests (Oom *et al.* 2009).

In 2010, the government engaged in a project aiming to conserve representative terrestrial ecosystems, particularly within the forest belt, in partnership with the Global Environment Facility (GEF) and United Nations Environment Programme (UNEP) (PRODOC 2010). The project plans to establish five protected areas in the south-east: Dulombi and Boé National Parks, and three corridors for fauna (Fig. 1). These include areas of both regional and national ornithological importance. Dulombi is considered to be the most biodiverse region in Guinea-Bissau and is

an Important Bird Area (IBA) harbouring 202 bird species and a variety of mammals, including ten primate, 13 carnivore and 17 ungulate species (Limoges 1989, Pacheco *et al.* 1997, Dodman *et al.* 2004). Although part of the Boé region is also an IBA, largely based on the Vendu Tcham wetland in the west (Fig. 1), ornithological data from other areas were lacking (Dodman *et al.* 2004).

Here I provide information on the avifauna of the Boé region during the dry-season months of January–February 2013, with additional records made by Piet Wit (PW) during his regular visits to the area since 2007. I also briefly discuss the current threats to, and conservation prospects for, the region. The study was undertaken on behalf of Foundation Chimbo, a Dutch NGO (<http://www.chimbo.org>) that cooperates with the local NGO Daridibó (<http://www.daridibo.org>). Both organisations have been active in the Boé region since 2007, implementing a community-based conservation programme primarily aimed to conserve Western Chimpanzee *Pan troglodytes verus* and its habitat, by integrating nature conservation and ecotourism into local development plans as a potential source of revenue for the local population.

Study area

The Boé is a remote region in south-eastern Guinea-Bissau (13°56'W 11°50'N), extending over c.3,000 km² between the Corubal River and the Guinea border (Fig. 1). It is almost devoid of driveable roads and basic infrastructure, and is sparsely inhabited. The local population practices subsistence agriculture, hunting and gathering. The Fula constitutes the main ethnic group; they have a detailed knowledge of their environment and are traditionally engaged in the sustainable use of natural habitats and wildlife.

Compared to the rest of the country, the area is characterised by higher rainfall and shallow soils (Catarino *et al.* 2008), with a mean annual rainfall of 1,600–2,100 mm and temperature of 28°C. The dry season commences in October and lasts until the end of May; April is the hottest month averaging 29°C. The area covers the main forest-savanna belt of Guinea-Bissau. The dominant vegetation is that of the Sudan-Guinea Savanna biome, comprising a variety of dry and semi-dry habitats (see Wit & Reinjtes 1989 for further

details). The landscape is dominated by wooded savanna interspersed by more open areas of shrub and grassland maintained by frequent fires set by shepherds and hunters (Catarino 2004). Slash-and-burn agriculture for rice and other crops is widespread around villages. Cleared land is cultivated for one or two seasons, after which it is left fallow. Savanna woodlands are typically 'edge-like' (i.e. open); the commonest tree species include *Pterocarpus erinaceus*, *Crossopteryx febrifuga*, *Parkia biglobosa* and *Terminalia albida*, with *Combretum glutinosum* the most frequently occurring shrub (Wit & Reinjtes 1989, Catarino *et al.* 2008). Along rivers and streams remnants of gallery forest remain, which include mostly evergreen trees such as *Sterculia tragacantha*, *Ceiba pentandra*, *Pterocarpus* spp. and *Azelia africana*. A large freshwater lake, Vendu Tcham, in the west of the region (Fig. 1), supports a variety of waterbirds (Rodwell 1996, Pacheco *et al.* 1997).

Methods

Field work was conducted on 16–22 January 2013 and 4–15 February 2013, which corresponds to the middle of the dry season. Bird surveys were undertaken in the environs of three villages (*tabancas*): Béli (the only *tabanca* in the region with tourism facilities), Pataque and Lugajole (Fig. 1). The study area is located in the central Boé, just south of the proposed Boé National Park. Bird surveys were conducted during the first five hours after dawn and three hours before dusk, via walked transects, totalling c.100 km, along existing tracks through various habitats. Whenever the vegetation was too dense to permit normal progression, e.g. within some gallery forests, randomly sited ten-minute point counts were employed. All birds seen were recorded and habitat was registered. Some drives along transects were undertaken at night to record nocturnal species. The main field guide used was Borrow & Demey (2001), but Sinclair & Ryan (2003) was also consulted. The xeno-canto website (<http://www.xeno-canto.org>) was consulted for bird vocalisations. No playback was used.

Results

A total of 170 bird species was recorded during the surveys. Including records by P. Wit in 2007–13, the number of species known from this part of the Boé totals 188. Given that the

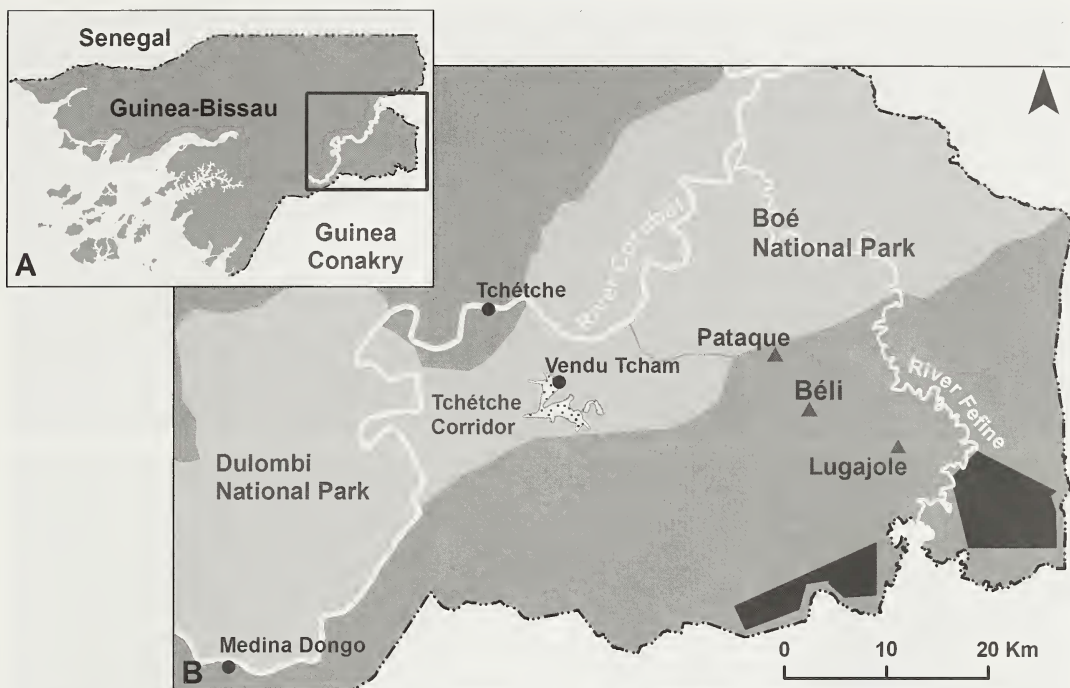


Figure 1. (A) Location of the Boé region, south-east Guinea-Bissau; (B) Map of Boé showing the villages of Béli, Pataque and Lugajole, those of Tchétche and Medina Dongo visited by Rodwell (1996) in 1992, and Vendu Tcham wetland. The prospected Dulombi and Boé National Parks and the Tchétche corridor for fauna are represented in pale grey, bauxite mining concessions areas in dark grey (limits according to Cassamá 2009).

study was conducted over a short period in the dry season, further surveys, particularly during the wet season (mid June to October), should increase that total. For example, Dwarf Bittern *Ixobrychus sturmii* was recorded by PW in July, and Spur-winged Goose *Plectropterus gambensis* is regularly seen (Boé villagers pers. comm.). In the dry season of 1992, Rodwell (1996) visited the villages of Tchétche and Medina Dongo along the Corubal River in the west and south-west of the region for five days (28 March–1 April), reporting 70 species, of which 23 were not detected by the present survey. Adding Rodwell’s observations, the Boé region supports 208 bird species, or c.41% of the 508 species listed for the country by Dodman *et al.* (2004).

In total, 23 species of diurnal raptors (Accipitridae, Pandionidae and Falconidae) have been recorded since 2007. These include five species of global conservation concern, three of them classified as Endangered (Hooded Vulture *Necrosyrtes monachus*, White-backed Vulture *Gyps*



Figure 2. Beaudouin’s Snake Eagle / Guincho da Guiné *Circaetus beaudouini*, Lugajole, Boé, Guinea-Bissau, 14 February 2013 (João L. Guilherme)

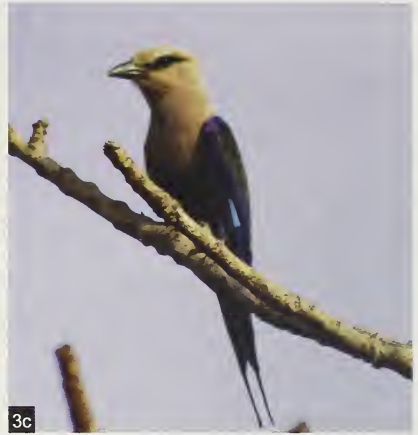
africanus and Rüppell’s Vulture *G. rueppellii*), one Vulnerable (Beaudouin’s Snake Eagle *Circaetus beaudouini*; Fig. 2) and one Near Threatened



3a



3b



3c



3d



3e



3f

Figure 3. Some common species found in the Boé region during the dry season: (a) African Harrier Hawk / serpentário-pequeno *Polyboroides typus* (Marco Mirinha); (b) Striped Kingfisher / pica-peixe-riscado *Halcyon chelicuti* (João L. Guilherme); (c) Blue-bellied Roller / rolieiro-de-barriga-azul *Coracias cyanogaster* (Marco Mirinha); (d) Green Wood-hoopoe / zombeteiro-de-bico-vermelho *Phoeniculus purpureus* (Joost Van Schijndel); (e) African Grey Hornbill / bico-de-serra-cinzeno *Tockus nasutus* (Joost Van Schijndel); (f) White Helmetshrike / poupinha *Prionops plumatus* (Joost Van Schijndel)

(Bateleur *Terathopius ecaudatus*) (BirdLife International 2013). Although it was impossible to assess the importance of the area for vultures (see Appendix 1 for encounter rates and number

of individuals recorded), the fairly high densities of large wild mammals suggest that the area is significant year-round for these scavengers.

Twenty-three species restricted to the Sudan-Guinea Savanna biome were recorded during my surveys (Appendix 1), or 43% of the total species restricted to this biome (Fishpool & Evans 2001). Black-faced Firefinch *Lagonosticta larvata* (also a Sudan-Guinea Savanna biome-restricted species) was previously recorded in the region in November 2009 (Appendix 1). In Guinea-Bissau, only the nearby Dulombi IBA has more species restricted to this biome (25; Dodman *et al.* 2004). Although the study area is dominated by savanna habitats, 12 bird species restricted to the Guinea-Congo Forest biome were found (Appendix 1), mostly in gallery forest along rivers and seasonal streams, and included Red-thighed Sparrowhawk *Accipiter erythropus*, Turati's Boubou *Laniarius turatii*, Black-winged Oriole *Oriolus nigripennis*, Forest Chestnut-winged Starling *Onychognathus fulgidus* and Chestnut-breasted Negrofinch *Nigrita bicolor*.

Common species in savannas included Blue-spotted Wood Dove *Turtur afer*, Black-billed Wood Dove *T. abyssinicus*, Vinaceous Dove *Streptopelia vinacea*, African Grey Hornbill *Tockus nasutus*, Sun Lark *Galerida modesta*, Common Wattle-eye *Platysteira cyanea*, Variable Sunbird *Cinnyris venustus*, Northern Puffback *Dryoscopus gambensis*, Fork-tailed Drongo *Dicrurus adsimilis* and Red-cheeked Cordon-bleu *Uraeginthus bengalus*. Also common were mixed flocks of Ploceidae of up to 400 birds, mostly comprising Village Weavers *Ploceus cucullatus*, Red-billed Queleas *Quelea quelea*, Black-winged Bishops *Euplectes hordeaceus* and Northern Red Bishops *E. franciscanus*. Red-eyed Dove *Streptopelia semitorquata*, African Grey Hornbill *Tockus nasutus* and a variety of waxbills (Estrildidae), including flocks of up to 80 Orange-cheeked Waxbills *Estrilda melpoda*, were common in cultivation. In forests along streams and gallery forests, common species included Green Turaco *Tauraco persa*, Red-bellied Paradise Flycatcher *Terpsiphone rufiventer* and Grey-backed Camaroptera *Camaroptera brachyura*. In villages, Violet Turaco *Tauraco* (= *Musophaga*) *violaceus*, Common Bulbul *Pycnonotus barbatus* and Beautiful Sunbird *Cinnyris pulchellus* were common (see Appendix 1).

Proof of breeding was noted only for Red-chested Swallow *Hirundo lucida* and Beautiful Sunbird *Cinnyris pulchellus*, with pairs seen nest building. Behaviour indicative of breeding was observed for Black-bellied Bustard *Eupodotis melanogaster*, African Wattled Lapwing *Vanellus senegallus*, Turati's Boubou and African Paradise Flycatcher *Terpsiphone viridis*, among others.

Finally, two bee-eaters that may have been Blue-moustached Bee-eaters *Merops mentalis* were observed by PW in December 2010. However, as this would constitute a substantial westward range extension, this species' presence requires confirmation.

Species new to Guinea-Bissau

Chestnut-backed Sparrow Lark *Eremopterix leucotis*

A male and female were observed for *c.* 10 minutes on 20 January 2013 by myself and F. Leitão (Daridibó staff) in an open area with bare ground near Béli (11°51'N 13°55'W). The male, which was chasing the female, had a contrasting black-and-white head pattern, black breast and deep chestnut upperparts. The female had a dark-mottled head and chestnut wings. Common throughout much of its large African range and known from neighbouring Senegal and Guinea (Borrow & Demey 2001, Dowsett *et al.* 2013c, g).

Lesser Striped Swallow *Cecropis abyssinica*

Six on 13 February 2013 within a mixed flock comprising eight Red-breasted Swallows *Cecropis semirufa*, 12 Pied-winged Swallows *Hirundo leucosoma* and ten Red-chested Swallows *H. lucida*, over Lugajole (11°48'N 13°51'W). Easily identified by its streaked underparts, rufous head and rump, and long tail streamers. Widespread south of the Sahel and Guinea-Bissau is the only country in the region where the species had not been documented (Borrow & Demey 2001, Dowsett *et al.* 2013a–i).

Heuglin's Wheatear *Oenanthe heuglini*

One singing and displaying in recently burnt grassland near Lugajole (11°48'N 13°52'W) on 14 February 2013 (Fig. 4). It was conspicuously long-legged and adopted an erect posture, with a very broad black terminal tail band. Isabelline Wheatear *O. isabellina*, with which I am familiar



Figure 4. Heuglin's Wheatear / chasco de Heuglin *Oenanthe heuglini*, Boé, Guinea-Bissau, 14 February 2013 (João L. Guilherme)



Figure 5. Dwarf Bittern / garçote-preto *Ixobrychus sturmii*, Boé, Guinea-Bissau, 14 July 2011 (Piet Wit)

in Central Asia, has a similar display flight, but could immediately be eliminated, as the bird was smaller, with overall darker plumage and a rufous-buff breast. Intra-African migrant between the Sahel and Sudan-Guinean Savanna (Borrow & Demey 2001), in neighbouring countries it has been recorded only in Guinea and Mali (Dowsett *et al.* 2013c, f).

Notes on selected species

Species of conservation concern (BirdLife International 2013) are indicated by EN = Endangered, VU = Vulnerable and NT = Near Threatened.

Dwarf Bittern *Ixobrychus sturmii*

Three singles observed along the Béli–Tchéte road in 14 July 2011, one of them near a temporary pool (Fig. 5). The species, which is known from all neighbouring countries (Barlow *et al.* 1997, Borrow & Demey 2001), is not included in the ABC Guinea-Bissau checklist (Dowsett *et al.* 2013d). However, it is listed for Ilha de Bolama and Rio Grande de Buba IBA by Dodman *et al.* (2004), based on a record at Buba in February 1997 (B. de Bruijn & K. de Jong *in litt.* 2003).

Hooded Vulture *Necrosyrtes monachus* EN

Often associated with human settlements and frequently observed foraging on rubbish. Approximately 40 roosted in trees near Béli on 17 January. Other observations included 1–11

soaring over a variety of habitats. Only two were seen in Madina Dongo in the 1990s (Rodwell 1996). The species is apparently not persecuted or poisoned here, unlike elsewhere in Africa (Ogada & Buij 2011).

White-backed Vulture *Gyps africanus* EN

One soaring over Béli on 21 January 2013, with 11 Hooded and three Rüppell's Vultures *Gyps rueppellii*. One found dead (cause of death unknown) by Daridibó staff in January 2013. Tall trees, providing roosting and potential nest sites, and good populations of large wild mammals may constitute important resources for the species in the study area.

Rüppell's Vulture *Gyps rueppellii* EN

Three adults soaring over Béli on 21 January 2013, with 11 Hooded Vultures and a White-backed Vulture.

Beaudouin's Snake Eagle *Circaetus beaudouini* VU

Three records: one near Vendu Tcham (11°51'20"N 14°07'30"W) on 22 January 2013, one north-west of Béli (11°52'18"N 13°54'44"W) on 11 February, and one over Lugajole (13°51'25"N 11°48'34"W; Fig. 2) on 14 February.

Bateleur *Terathopius ecaudatus* NT

Singles near Pataque on 7 January 2013, near Vendu Tcham on 15 January, north-east of Béli



Figure 6. Flappet Lark / cotovia-zumbidora *Mirafrja rufocinnamomea*, Boé, Guinea-Bissau, 5 February 2013 (João L. Guilherme)

on 11 and, probably the same individual, 12 February.

Red-thighed Sparrowhawk *Accipiter erythropus*

Two (possibly a pair) in savanna woodland near Béli on 19 January 2013. Restricted to the Guinea-Congo Forest biome, with scattered records in Guinea-Bissau and neighbouring countries (Borrow & Demey 2001).

African Finfoot *Podica senegalensis*

Juvenile observed by PW along the Corubal River, c.100 m downstream of Tchétche (11°55'N 14°12'W) on 1 May 2008. Although regarded as shy (Sinclair & Ryan 2003), this bird did not seem disturbed by the presence of people and a ferry. Dodman *et al.* (2004) include this species on the list for Vendu Tcham IBA, based on two sightings in 1997 at Tchétche during different seasons (R. Matías *in litt.* 2004). Occurs in neighbouring Senegal and Guinea, and Gambia (Dowsett *et al.* 2013c, g, i).

Senegal Parrot *Poicephalus senegalus*

Pairs observed at Béli on 17 January 2013, over grassland near Béli on 20 January, and over savanna woodland near Pataque on 7 February. Not considered threatened and population appears stable, perhaps even benefiting from clearance of closed-canopy forests (BirdLife International 2013). However, it is frequently kept as a cagebird and subject to significant poaching for the pet

trade, and is therefore listed in Annex II of CITES as of 'possible concern' (Inskipp *et al.* 1988).

Flappet Lark *Mirafrja rufocinnamomea*

One photographed north of Béli on 5 February 2013 (Fig. 6). Four performing display flights accompanied by characteristic wing rattling in a recently burnt grassland near Lugajole on 14 February. Although not listed in the ABC checklist (Dowsett *et al.* 2013d), it has previously been recorded in Guinea-Bissau (Dodman *et al.* 2004), based on sightings in 1997 at Tchétche in different seasons (R. Matías *in litt.* 2004).

Grey-rumped Swallow *Pseudhirundo griseopyga*

Common in savanna habitats, with flocks of 3–8 regularly seen over open grassland. Borrow & Demey (2001) map one record in Guinea-Bissau.

Turati's Boubou *Laniarius turatii*

Regularly seen in woodland and gallery forest, often in the understorey.

Black-winged Oriole *Oriolus nigripennis*

Two were seen near Pataque (11°53'N 13°57'W) on 6 February 2013, foraging at the edge of gallery forest and a cashew plantation. They were located by their melodious oriole-like *whute-luw* calls. One was an adult with a black head and upper breast, red bill and plain olive back. Black central tail feathers were noted and no white patch at the edge of the wing was present, excluding Western Black-headed Oriole *O. brachyrhynchus*. The other bird was an immature with a streaked throat and upper breast; bill and overall plumage were slightly duller than in the adult. Not listed in the ABC Guinea-Bissau checklist (Dowsett *et al.* 2013d), but reported on the Bijagós archipelago by Dodman *et al.* (2004) based on a record of two in December 1986 (Altenburg & van der Kamp 1992).

Dybowski's Twinspot *Euschistospiza dybowskii*

Several observations, including a male singing in gallery forest near Béli, a flock of seven in a cashew plantation near Pataque, and singles and pairs in cashew plantations, agricultural land and along streams. Has been recorded in neighbouring Senegal (apparently just three records: Fernández-García *et al.* 2013) and Guinea (Dowsett *et al.* 2013c, g). In Guinea-Bissau, known only from

the Boé (Dodman *et al.* 2004); it is not listed in the ABC Guinea-Bissau checklist (Dowsett *et al.* 2013d).

Threats and conservation

The Boé region harbours a significant and diverse fauna and flora and constitutes an exciting birding destination in West Africa. Aside from birds, the region is important for many mammals. During this survey, Western African Chimpanzee was observed in gallery forest and savanna woodland several kilometres north-east of Béli. Other primates such as Green Monkey *Chlorocebus aethiops sabaenus* and Red Monkey *Erythrocebus patas* were common in savanna habitat, whereas more elusive species, such as King Colobus *Colobus polykomos*, were observed in gallery forest remnants. Other mammals recently observed include Forest Buffalo *Syncerus caffer nanus* and Leopard *Panthera pardus* (J. Van Schijndel pers. comm.).

However, current human development and external pressures may constitute serious threats to conservation in the Boé region. The loss of natural forest cover is probably the most serious threat to its biodiversity. Over the last 17 years dense forest has declined by 50% (Cassamá 2009) due to illegal timber exploitation, conversion to agriculture and uncontrolled bushfires set by farmers, hunters and cattle herders. Although timber extraction is illegal, the occurrence of economically important trees, including *Azelia africana* (Vulnerable), *Pterocarpus erinaceus* and *Prosopis africana*, encourages illegal exploitation (lorries loaded with timber observed leaving the area). No data exist concerning the impact of illegal forest clearance, but some species may have been reduced to alarmingly low densities (Cassamá 2009).

Traditional agricultural practices are primarily based on annual cutting and burning of forest to cultivate rice, the main crop of local communities. The impact of land clearance for agriculture is most evident around settlements but more remote areas are also affected. Immigration of slash-and-burn farmers and livestock herders from neighbouring Guinea, and the establishment of new *tabancas*, may also increase conflict between Man and nature. As observed elsewhere in Guinea-Bissau, the reduction of natural forest is also associated with conversion to cashew plantations. Although

the area of such plantations in my study area is not large, around some *tabancas*, such as Pataque and Béli, these are sited near watercourses to the detriment of gallery forest.

Hunting is widespread. All of the hunters encountered were local villagers who target mainly birds, e.g. Double-spurred Francolin *Francolinus bicalcaratus* and Helmeted Guineafowl *Numida meleagris*. In villages, Violet Turaco *Tauraco violacea* is targeted by children. Sport 'trophy' hunting (mainly of mammals) by tourists from Bissau, neighbouring countries and even Europe also occurs (Cassamá 2009). The region is frequently visited by poachers who illegally hunt and export bushmeat to Guinea (Béli villagers pers. comm.). Fire is used by hunters to make target species, especially mammals, move into open areas. During the field work c.140 ha of savanna woodland and grassland near Lugajole was recently burnt by hunters from Guinea (Lugajole villagers pers. comm.). As over most of Africa, unregulated hunting may lead to serious declines in larger mammals. For example, Forest Buffalo *Syncerus caffer nanus* is now confined to gallery forest along the Fefine River (J. Van Schijndel pers. comm.).

Bauxite mining is expected to become important economically, coupled with the development of infrastructure such as the ongoing construction of roads and a planned railway. The government has already granted concessions for two areas, totalling c.400 ha, for bauxite mining near the border with Guinea (Fig. 1).

Despite the study area's biodiversity, and the importance of its conservation, the area was not included within the proposed Boé National Park (see Cassamá 2009). Vendu Tcham Lake and its environs were included within the conservation plan as a faunal corridor but, strangely, most of the area to the south, proposed as an IBA by Dodman *et al.* (2004), was also omitted. This was probably due to a shortage of scientific data; the present work and future investigation may assist in redefining the limits of Vendu Tcham IBA (Dodman *et al.* 2004) and, hopefully, the final borders of Boé National Park. The latter may boost sustainable development of the Boé based on nature conservation and ecotourism. To achieve this, joint efforts by the government, international agencies and local NGOs are essential. Development of a conservation strategy

for the Boé region should follow a community-based approach, by involving local populations in the planning, decision-making and management of natural resources (Neumann 1998). Special care should be given to avoid ineffective and authoritarian projects, as previously described elsewhere in Guinea-Bissau (Temudo 2012).

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Appendix 1. List of bird species recorded in January–February 2013 in the Boé region, south-east Guinea-Bissau. Additional species recorded by Piet Wit in 2007–13 (with approximate date of observation) are included. Sequence and taxonomy follow Dowsett *et al.* (2013d) with some amendments. Species marked * represent additions to the Guinea-Bissau list. Encounter rate = no. of individuals recorded per ten hours of census. IUCN threat status (BirdLife International 2013): EN = Endangered, VU = Vulnerable, NT = Near Threatened. Biome-restricted species (Fishpool & Evans 2001): SGS = Sudan-Guinea Savanna, GCF = Guinean-Congo Forest. Species recorded by Rodwell (1996) in Tchêche and Medina Dongo, and also recorded during the present study, are indicated.

Lista das espécies de aves registadas em janeiro e fevereiro de 2013 no sector do Boé, sudeste da Guiné-Bissau. Incluem-se os registos efectuados na região por P. Wit durante 2007–13 (datas de observação aproximadas). Sequência e taxonomia de acordo com Dowsett *et al.* (2013d) com pequenas alterações. As espécies com * constituem novos registos para a Guiné-Bissau. Taxa de encontro = nº de indivíduos registado por dez horas de observação. Categorias de ameaça IUCN (BirdLife International 2013): EN = Em Perigo, VU = Vulnerável, NT = Quase Ameaçado. Espécies restritas a um bioma (Fishpool & Evans 2001): SGS = Savana Sudano-Guineense, GCF = Floresta Guineo-Congoleza. São ainda indicadas as espécies registadas por Rodwell (1996) em Tchêche e Medina Dongo que também foram observadas neste estudo.

English name	Scientific name	Encounter rate	Wit 2007–13	IUCN	Biome	Rodwell (1996)
Ardeidae						
Dwarf Bittern	<i>Ixobrychus sturmii</i>	-	Jul 11			
Squacco Heron	<i>Ardeola ralloides</i>	0.3				
Cattle Egret	<i>Bubulcus ibis</i>	0.9				
Green-backed Heron	<i>Butorides striata</i>	0.1				x
Intermediate Egret	<i>Egretta intermedia</i>	0.1				
Scopidae						
Hamerkop	<i>Scopus umbretta</i>	0.3				
Pandionidae						
Osprey	<i>Pandion haliaetus</i>	-	May 09			
Accipitridae						
Black Kite	<i>Milvus migrans</i>	0.3				
African Fish Eagle	<i>Haliaeetus vocifer</i>	-	common			x
Palm-nut Vulture	<i>Gypohierax angolensis</i>	0.3				
Hooded Vulture	<i>Necrosyrtes monachus</i>	4.9		EN		x

English name	Scientific name	Encounter rate	Wit 2007–13	IUCN	Biome	Rodwell (1996)
White-backed Vulture	<i>Gyps africanus</i>	0.1		EN		
Rüppell's Vulture	<i>Gyps rueppellii</i>	0.1		EN		
Short-toed Snake Eagle	<i>Circaetus gallicus</i>	-	Sep 09			
Beaudouin's Snake Eagle	<i>Circaetus beaudouini</i>	0.4		VU		
Brown Snake Eagle	<i>Circaetus cinereus</i>	-	common			
Western Banded Snake Eagle	<i>Circaetus cinerescens</i>	-	Jul 11			
Bateleur	<i>Terathopius ecaudatus</i>	0.5		NT		
African Harrier Hawk	<i>Polyboroides typus</i>	1.9				x
Gabar Goshawk	<i>Micronisus gabar</i>	0.1				x
Dark Chanting Goshawk	<i>Melierax metabates</i>	0.3				
Shikra	<i>Accipiter badius</i>	1.0				
Red-thighed Sparrowhawk	<i>Accipiter erythropus</i>	0.1			GCF	
Black Sparrowhawk	<i>Accipiter melanoleucus</i>	0.5				
Lizard Buzzard	<i>Kaupifalco monogrammicus</i>	1.3				
African Hawk Eagle	<i>Aquila spilogaster</i>	-	Oct 13			
Falconidae						
Common Kestrel	<i>Falco tinnunculus</i>	0.3				
Grey Kestrel	<i>Falco ardosiaceus</i>	0.4				
Lanner Falcon	<i>Falco biarmicus</i>	0.1				
Phasianidae						
Stone Partridge	<i>Ptilopachus petrosus</i>	-	Nov 11			
Double-spurred Francolin	<i>Francolinus bicalcaratus</i>	4.0				x
Numididae						
Helmeted Guineafowl	<i>Numida meleagris</i>	3.1				x
Rallidae						
Black Crake	<i>Amauromis flavirostris</i>	0.3				
Heliornithidae						
African Finfoot	<i>Podica senegalensis</i>	-	Dec 08			
Otididae						
Black-bellied Bustard	<i>Eupodotis melanogaster</i>	0.5				
Jacaniidae						
African Jacana	<i>Actophilornis africanus</i>	0.3				
Glareolidae						
Bronze-winged Courser	<i>Rhinoptilus chalcopterus</i>	0.1				
Charadriidae						
Forbes's Plover	<i>Charadrius forbesi</i>	-	Jan 09			
African Wattled Plover	<i>Vanellus senegallus</i>	1.4				x
Scolopacidae						
Green Sandpiper	<i>Tringa ochropus</i>	-	Nov 09			
Pteroclididae						
Four-banded Sandgrouse	<i>Pterocles quadricinctus</i>	0.1				
Columbidae						
African Green Pigeon	<i>Treron calva</i>	4.3				
Blue-spotted Wood Dove	<i>Turtur afer</i>	3.1				
Black-billed Wood Dove	<i>Turtur abyssinicus</i>	4.6				
Namaqua Dove	<i>Oena capensis</i>	0.4				
Red-eyed Dove	<i>Streptopelia semitorquata</i>	6.9				
Vinaceous Dove	<i>Streptopelia vinacea</i>	5.4				
Laughing Dove	<i>Streptopelia senegalensis</i>	2.3				
Psittacidae						
Senegal Parrot	<i>Poicephalus senegalus</i>	0.8			SGS	
Rose-ringed Parakeet	<i>Psittacula krameri</i>	-	Dec 09			
Musophagidae						
Green Turaco	<i>Tauraco persa</i>	1.5			GCF	x
Violet Turaco	<i>Tauraco violaceus</i>	3.8			SGS	
Western Grey Plantain-eater	<i>Crinifer piscator</i>	2.5				
Cuculidae						
Klaas's Cuckoo	<i>Chrysococcyx klaas</i>	0.3				x
Black-throated Coucal	<i>Centropus leucogaster</i>	0.3			GCF	

English name	Scientific name	Encounter rate	Wit 2007–13	IUCN	Biome	Rodwell (1996)
Black Coucal	<i>Centropus grillii</i>	-	Oct 07			
Senegal Coucal	<i>Centropus senegalensis</i>	2.0				x
Tytonidae						
Barn Owl	<i>Tyto alba</i>	0.1				
Strigidae						
African Scops Owl	<i>Otus senegalensis</i>	0.4				x
Spotted Eagle Owl	<i>Bubo africanus</i>	0.1				
Caprimulgidae						
Long-tailed Nightjar	<i>Caprimulgus climacurus</i>	0.1				
Standard-winged Nightjar	<i>Macrodipteryx longipennis</i>	0.1				
Apodidae						
African Palm Swift	<i>Cypsiurus parvus</i>	3.1				
Little Swift	<i>Apus affinis</i>	0.6				
Alcedinidae						
Blue-breasted Kingfisher	<i>Halcyon malimbica</i>	0.9				x
Striped Kingfisher	<i>Halcyon chelicuti</i>	0.8				
Shining-blue Kingfisher	<i>Alcedo quadibrachys</i>	0.3				x
Giant Kingfisher	<i>Megaceryle maxima</i>	0.1				x
Meropidae						
Blue-cheeked Bee-eater	<i>Merops persicus</i>	0.4				
European Bee-eater	<i>Merops apiaster</i>	5.4				
Coraciidae						
Rufous-crowned Roller	<i>Coracias naevius</i>	-	Jan 09			
Blue-bellied Roller	<i>Coracias cyanogaster</i>	1.4			SGS	
Abyssinian Roller	<i>Coracias abyssinicus</i>	1.0				
Phoeniculidae						
Green Wood-hoopoe	<i>Phoeniculus purpureus</i>	0.6				
Black Scimitarbill	<i>Rhinopomastus aterrimus</i>	1.0				
Upupidae						
Hoopoe	<i>Upupa epops</i>	-	Jan 12			
Bucerotidae						
African Pied Hornbill	<i>Tockus fasciatus</i>	2.5			GCF	x
African Grey Hornbill	<i>Tockus nasutus</i>	6.1				x
Capitonidae						
Yellow-rumped Tinkerbird	<i>Pogoniulus bilineatus</i>	1.3				
Yellow-fronted Tinkerbird	<i>Pogoniulus chrysoconus</i>	0.9				
Bearded Barbet	<i>Lybius dubius</i>	0.1			SGS	
Indicatoridae						
Greater Honeyguide	<i>Indicator indicator</i>	0.1				
Picidae						
Fine-spotted Woodpecker	<i>Campethera punctuligera</i>	0.4				
Buff-spotted Woodpecker	<i>Campethera nivosa</i>	0.3			GCF	
Cardinal Woodpecker	<i>Dendropicus fuscescens</i>	0.5				
Grey Woodpecker	<i>Dendropicus goertae</i>	0.8				
Alaudidae						
Flappet Lark	<i>Mirafr rufocinnamomea</i>	0.6				
Sun Lark	<i>Galerida modesta</i>	3.6			SGS	
*Chestnut-backed Sparrow Lark	<i>Eremopterix leucotis</i>	0.3				
Hirundinidae						
Fanti Saw-wing	<i>Psalidoprogne obscura</i>	0.1			GCF	
*Lesser Striped Swallow	<i>Cecropis abyssinica</i>	0.6				
Red-breasted Swallow	<i>Cecropis semirufa</i>	2.6				
Grey-rumped Swallow	<i>Pseudhirundo griseopyga</i>	0.6				
Pied-winged Swallow	<i>Hirundo leucosoma</i>	5.4			SGS	x
Red-chested Swallow	<i>Hirundo lucida</i>	0.5				
Motacillidae						
Tree Pipit	<i>Anthus trivialis</i>	1.9				
Yellow-throated Longclaw	<i>Macronyx croceus</i>	0.3				

English name	Scientific name	Encounter rate	Wit 2007–13	IUCN	Biome	Rodwell (1996)
Campephagidae						
Red-shouldered Cuckooshrike	<i>Campephaga phoenicea</i>	0.6				x
White-breasted Cuckooshrike	<i>Coracina pectoralis</i>	0.6				
Pycnonotidae						
Yellow-throated Leaflove	<i>Chlorocichla flavicollis</i>	3.6				
Leaflove	<i>Phyllastrephus scandens</i>	0.5				x
Common Bulbul	<i>Pycnonotus barbatus</i>	30				
Turdidae						
Snowy-crowned Robin Chat	<i>Cossypha niveicapilla</i>	0.3				x
White-crowned Robin Chat	<i>Cossypha albicapilla</i>	0.4			SGS	
Whinchat	<i>Saxicola rubetra</i>	0.4				
*Heuglin's Wheatear	<i>Oenanthe heuglini</i>	0.1				
White-fronted Black Chat	<i>Myrmecocichla albibrons</i>	0.5			SGS	
African Thrush	<i>Turdus pelios</i>	1.1				
Cisticolidae						
Singing Cisticola	<i>Cisticola cantans</i>	0.4				x
Rufous Cisticola	<i>Cisticola rufus</i>	0.3			SGS	
Tawny-flanked Prinia	<i>Prinia subflava</i>	4.6				x
Red-winged Warbler	<i>Heliolais erythropterus</i>	0.5				x
Yellow-breasted Apalis	<i>Apalis flavida</i>	0.4				
Grey-backed Camaroptera	<i>Camaroptera brachyura</i>	3.4				x
Sylviidae						
African Moustached Warbler	<i>Melocichla mentalis</i>	0.9				
Melodious Warbler	<i>Hippolais polyglotta</i>	1.1				
Senegal Eremomela	<i>Eremomela pusilla</i>	2.6			SGS	x
Willow Warbler	<i>Phylloscopus trochilus</i>	0.4				
Oriole Warbler	<i>Hypergerus atriceps</i>	0.6			SGS	
Garden Warbler	<i>Sylvia borin</i>	0.1				
Yellow-bellied Hyliota	<i>Hyliota flavigaster</i>	0.1				x
Muscicapidae						
Northern Black Flycatcher	<i>Melaenomis edoloides</i>	3.5				x
Pale Flycatcher	<i>Melaenomis pallidus</i>	0.1				
Lead-coloured Flycatcher	<i>Myioparus plumbeus</i>	0.3				
Pied Flycatcher	<i>Ficedula hypoleuca</i>	1.8				
Monarchidae						
African Paradise Flycatcher	<i>Terpsiphone viridis</i>	0.3				x
Red-bellied Paradise Flycatcher	<i>Terpsiphone rufiventer</i>	2.5			GCF	
Platysteiridae						
Common Wattle-eye	<i>Platysteira cyanea</i>	6.3				x
Senegal Batis	<i>Batis senegalensis</i>	1.1				x
Timaliidae						
Brown Illadopsis	<i>Illadopsis fulvescens</i>	0.1			GCF	
Brown Babbler	<i>Turdoides plebejus</i>	3.0				
Blackcap Babbler	<i>Turdoides reinwardtii</i>	2.3			SGS	
Paridae						
White-shouldered Black Tit	<i>Parus guineensis</i>	0.3				x
Salpornithidae						
Spotted Creeper	<i>Salpornis spilonotus</i>	0.3				
Nectariniidae						
Green-headed Sunbird	<i>Cyanomitra verticalis</i>	1.1				x
Scarlet-chested Sunbird	<i>Chalcomitra senegalensis</i>	1.1				x
Collared Sunbird	<i>Hedydipna collaris</i>	0.4				
Pygmy Sunbird	<i>Hedydipna platura</i>	0.4				x
Beautiful Sunbird	<i>Cinnyris pulchellus</i>	3.3				x
Variable Sunbird	<i>Cinnyris venustus</i>	3.8				x
Splendid Sunbird	<i>Cinnyris coccinigaster</i>	0.9			SGS	x
Zosteropidae						
Yellow White-eye	<i>Zosterops senegalensis</i>	5.8				

English name	Scientific name	Encounter rate	Wit 2007–13	IUCN	Biome	Rodwell (1996)
Laniidae						
Yellow-billed Shrike	<i>Corvinella corvina</i>	1.3			SGS	
Malaconotidae						
Grey-headed Bush-shrike	<i>Malaconotus blanchoti</i>	0.3				
Sulphur-breasted Bush-shrike	<i>Malaconotus sulfureopectus</i>	1.3				x
Black-crowned Tchagra	<i>Tchagra senegalus</i>	1.8				x
Northern Puffback	<i>Dryoscopus gambensis</i>	2.8				x
Turati's Boubou	<i>Laniarius turatii</i>	1.4			GCF	
Yellow-crowned Gonolek	<i>Laniarius barbarus</i>	0.1				
Brubu	<i>Nilais afer</i>	1.1				
Prionopidae						
White Helmetshrike	<i>Prionops plumatus</i>	3.4				
Oriolidae						
Black-winged Oriole	<i>Oriolus nigripennis</i>	0.3			GCF	
African Golden Oriole	<i>Oriolus auratus</i>	0.4				
Dicruridae						
Square-tailed Drongo	<i>Dicrurus ludwigii</i>	0.3				
Fork-tailed Drongo	<i>Dicrurus adsimilis</i>	2.8				
Corvidae						
Pied Crow	<i>Corvus albus</i>	0.3				
Piapiac	<i>Ptilostomus afer</i>	1.5			SGS	
Sturnidae						
Forest Chestnut-winged Starling	<i>Onychognathus fulgidus</i>	0.1			GCF	
Purple Glossy Starling	<i>Lamprotermis purpureus</i>	0.5			SGS	
Bronze-tailed Glossy Starling	<i>Lamprotermis chalcurus</i>	0.3			SGS	
Lesser Blue-eared Starling	<i>Lamprotermis chloropterus</i>	0.9				
Long-tailed Glossy Starling	<i>Lamprotermis caudatus</i>	2.0				
Violet-backed Starling	<i>Cinnyricinclus leucogaster</i>	-	Apr 11			
Passeridae						
Northern Grey-headed Sparrow	<i>Passer griseus</i>	0.5				
Bush Petronia	<i>Petronia dentata</i>	4.1			SGS	
Chestnut-crowned Sparrow-weaver	<i>Plocepasser superciliosus</i>	1.1			SGS	x
Ploceidae						
Little Weaver	<i>Ploceus luteolus</i>	0.3				
Black-necked Weaver	<i>Ploceus nigricollis</i>	1.0				
Village Weaver	<i>Ploceus cucullatus</i>	60.0				
Red-billed Quelea	<i>Quelea quelea</i>	4.0				
Black-winged Bishop	<i>Euplectes hordeaceus</i>	3.8				
Northern Red Bishop	<i>Euplectes franciscanus</i>	2.8				
Yellow-mantled Widowbird	<i>Euplectes macrourus</i>	0.3				x
Estrildidae						
Chestnut-breasted Nigrofinch	<i>Nigrita bicolor</i>	0.4			GCF	x
Red-winged Pytilia	<i>Pytilia phoenicoptera</i>	1.1			SGS	
Dybowski's Twinspot	<i>Euschistospiza dybowskii</i>	1.6			SGS	
Red-billed Firefinch	<i>Lagonosticta senegala</i>	21.0				
Black-faced Firefinch	<i>Lagonosticta larvata</i>	-	Nov 09		SGS	
African Firefinch	<i>Lagonosticta rubricata</i>	-	Dec 10			x
Lavender Waxbill	<i>Estrilda caerulescens</i>	1.3			SGS	
Orange-cheeked Waxbill	<i>Estrilda melpoda</i>	3.4				x
Red-cheeked Cordon-bleu	<i>Uraeginthus bengalus</i>	11.0				
Bronze Mannikin	<i>Lonchura cucullata</i>	3.1				
Viduidae						
Village Indigobird	<i>Vidua chalybeata</i>	1.0				
Pin-tailed Whydah	<i>Vidua macroura</i>	6.6				
Sahel Paradise Whydah	<i>Vidua orientalis</i>	0.3				
Exclamatory Paradise Whydah	<i>Vidua interjecta</i>	0.1			SGS	
Fringillidae						
Yellow-fronted Canary	<i>Serinus mozambicus</i>	2.9				x